Graph Theory Quiz 3 (7 June 2019)
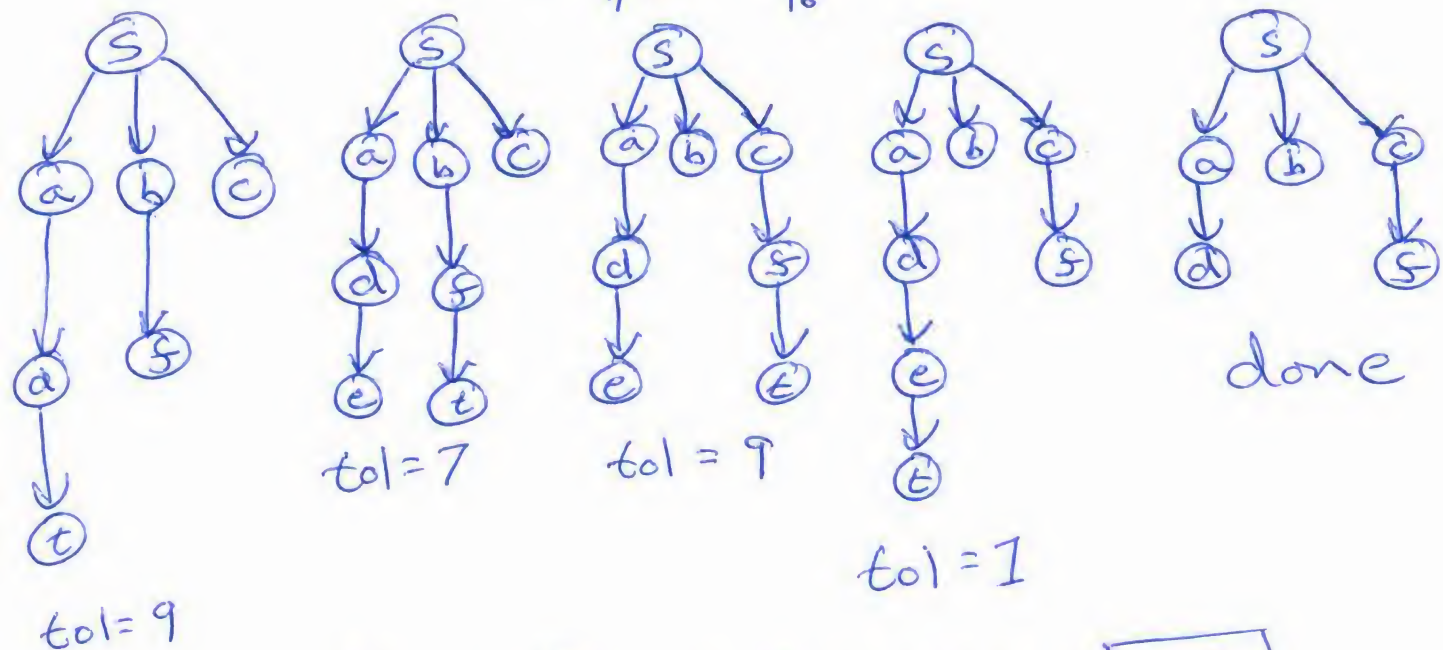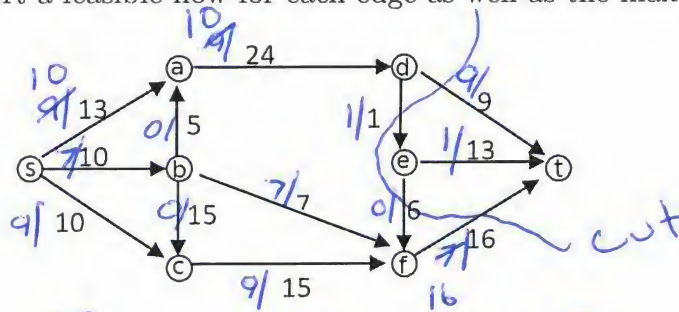Open book, open notes, open neighbor.

1. Use Ford-Fulkerson/Edmonds-Karp to find the maximum flow on the below network. Report a feasible flow for each edge as well as the max sum into the sink.
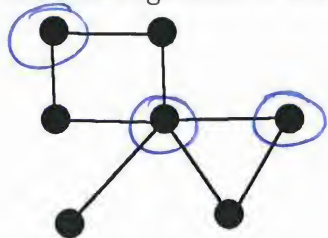

$$\text{Max flow} = 9 + 7 + 9 + 1 = \boxed{26}$$

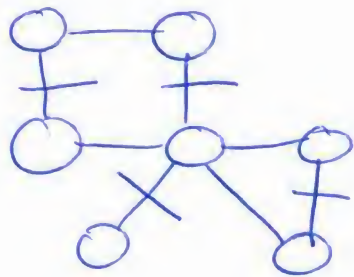2. What is the size of the minimum cut? Which edges comprise the cut?

$$\text{Min cut} = \text{max flow} = \boxed{26}$$

$$\text{Edges cut} = \{(d,t), (d,e), (f,t)\}$$

3. Draw an edge cover F and a vertex cover C for the below graph.
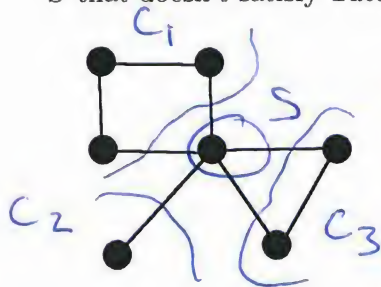

vertex cover

  - at least one endpoint
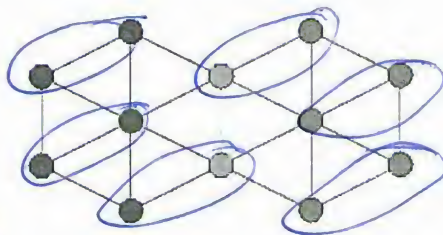 $\forall e \in E(G)$ from the cover

edge cover

  - all vertices $v \in V(F)$
    an endpoint in the cover

4. Either draw a perfect match or prove one doesn't exist by identifying a vertex set S that doesn't satisfy Tutte's Condition for the below graphs.

$$|S| = 1$$

$$o(G-S) = 2$$

$$|S| < o(G-S)$$

$$=> \text{no perfect match}$$

$$=> \text{perfect match}$$